

In the Claims

Please replace all prior versions of claims in the application with the following list of claims:

1. (Cancelled)
2. (Currently amended) A method, as claimed in claim 24 further comprising using an inherent property of the received DMT signal, wherein part of the signal is correlated, in the time domain, in terms of cyclic extensions.
3. (Currently amended) A method, as claimed in claim 24 further comprising estimating the time ^{*misalignment*} ~~mis-alignment~~ of ~~the cross-talk signals as components of cross-talkers from~~ the distance between the correlation maximum corresponding to ~~the~~ ^{*desired*} signal ~~(known location)~~ and other correlation maxima.
4. (Currently amended) A method, as claimed in claim 3 further comprising the step wherein ~~the amplitude of a correlation maximum is a relative measure of the power of the corresponding cross-talker~~ of estimating the relative power of a corresponding cross-talker from the amplitude of a correlation maximum.
5. (Currently amended) A method, as claimed in claim 3 further comprising the step ^{*as*} wherein, when a time offset of ~~the cross-talk~~ components of a cross-talker is estimated at ~~the~~ VDSL Transceiver Unit-Optical Network Unit (VTU-O), ^{*using*} ~~this information~~ the time offset is used to adjust its clock and frame boundaries to align with the cross-talker ~~and hence~~ ^{*so that*} orthogonality is achieved and distortion is minimized.
6. (Currently amended) A method, as claimed in claim 3 further comprising the step ^{*of*} wherein, ^{*when*} ~~if the~~ an auto-correlation peak amplitude of the cross-talk signal component of a cross-talker is low, ~~the~~ VDSL Transceiver Unit-Optical Network Unit (VTU-O) ~~can choose~~ ^{*choosing*} to not

^{its}
align clock and frame boundaries since the cross-talker then does not significantly contribute to distortion and hence a threshold level is used.

7. (Previously presented) A method, as claimed in claim 24 wherein the method ^{is} ~~can~~ be used for applications including Near End Cross-Talk (NEXT) cancellation algorithms and multi-user detection algorithms.

8. (Currently amended) A method, as claimed in claim 24 wherein, when the method is used in every starting-up modem in a telecommunications transmission system, all modems that cause interference in each other's receivers become aligned to the same frame timing.

9. (Currently amended) In a communication system having a transmission channel, a method comprising ^{the} ~~steps~~ steps of:

a) receiving a carrier signal on the transmission channel, wherein the carrier signal is part of a Discrete Multi Tone (DMT) modulated carrier signal, wherein the DMT modulated carrier signal includes cyclic extensions, and wherein the cyclic extensions include a cyclic prefix appended to the beginning of the DMT modulated carrier signal and a cyclic suffix appended to the end of the DMT modulated carrier signal;

b) applying an autocorrelation function to the carrier signal to generate a correlation signal, further comprising applying an autocorrelation function to the DMT modulated carrier signal using a delayed copy of the DMT modulated carrier signal in order to correlate the cyclic extensions of the DMT modulated carrier signal;

c) detecting correlation maxima of the carrier signal and correlation maxima of a crosstalk signal in the correlation signal;

d) determining a time misalignment between the carrier signal and the crosstalk signal based on a time shift of the correlation maxima of the carrier signal and the crosstalk signal; and

e) adjusting a frame timing of the carrier signal based on the time misalignment.

10.-13. (Cancelled)

14. (Currently amended) In a Very high bit rate Digital Subscriber Line (VDSL) communications system comprising a plurality of modem pairs, each modem pair including a first VDSL modem and a second VDSL modem, ^athe method comprising:

a) using the first VDSL modem of a first modem pair of the plurality of modem pairs to send a first discrete multitone (DMT) signal over a first transmission channel in a cable;

b) using the first VDSL modem of a second modem pair of the plurality of modem pairs to send a second DMT signal over a second transmission channel in the cable, wherein each DMT signal includes a DMT modulated carrier signal, wherein the DMT modulated carrier signal includes cyclic extensions, and wherein the cyclic extensions include a cyclic prefix appended to the beginning of the DMT modulated carrier signal and a cyclic suffix appended to the end of the DMT modulated carrier signal;

c) using the second VDSL modem of ^{the}a first modem pair ^{of the plurality of modem pairs} to receive the first DMT signal on the first transmission channel, the first DMT signal including a crosstalk from the second DMT signal;

d) applying an autocorrelation function to the first DMT signal to generate a correlation signal, further comprising applying ^{the}an autocorrelation function to the DMT modulated carrier signal using a delayed copy of the DMT modulated carrier signal in order to correlate the cyclic extensions of the DMT modulated carrier signal;

e) detecting, in the correlation signal, correlation maxima of the first DMT signal and correlation maxima of the crosstalk from the second DMT signal;

f) determining a time misalignment between the first DMT signal and the crosstalk from the second DMT signal based on a time shift of the correlation maxima of the first DMT signal and the correlation maxima of the crosstalk from the second DMT signal; and

g) adjusting a frame timing of the first modem of the first modem pair ^{of the plurality of modem pairs} based on the time misalignment.

15.-18. (Cancelled)

19. (Currently amended) In a communication system having a transmission channel, an apparatus comprising:

a) means for receiving a carrier signal on the transmission channel, wherein the carrier signal is part of a Discrete Multi Tone (DMT) modulated carrier signal, wherein the DMT modulated carrier signal includes cyclic extensions, and wherein the cyclic extensions include a cyclic prefix appended to the beginning of the DMT modulated carrier signal and a cyclic suffix appended to the end of the DMT modulated carrier signal;

b) means for applying an autocorrelation function to the carrier signal to generate a correlation signal, further comprising means for applying ^{the} an autocorrelation function to the DMT modulated carrier signal using a delayed copy of the DMT modulated carrier signal in order to correlate the cyclic extensions of the DMT modulated carrier signal;

c) means for detecting correlation maxima of the carrier signal and correlation maxima of a crosstalk signal in the correlation signal;

d) means for determining a time misalignment between the carrier signal and the crosstalk signal based on a time shift of the correlation maxima of the carrier signal and the crosstalk signal; and

e) means for adjusting a frame timing of the carrier signal based on the time misalignment.

20.-23. (Cancelled)

24. (Currently amended) A method for keeping Discrete Multi Tone (DMT) frames aligned to ~~the~~ same frame timing, for use in a telecommunications transmission system using a DMT system as a multicarrier system and having at least two Very high rate Digital Subscriber Line (VDSL) systems, each comprising a pair of modems, said at least two VDSL systems belonging to a single binder group common to both VDSL systems, comprising the steps of:

a) effecting a correlation between a received DMT signal comprising DMT symbols, each DMT symbol having cyclic extensions, and a delayed copy of the received DMT signal;

b) detecting correlation maxima which determine the frame boundaries of different DMT cross-talk components of the received ^{DMT} signal;

c) estimating the time ^{misalignment} ~~misalignment~~ from the correlation maxima; and

d) using the estimate by the modem of the pair of modems to synchronize its own frame timing to a main cross-talkers frame timing.